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A PRELIMINARY REPORT OF A STUDY OF THE EFFECTS OF COMPETITION AND COOPERATION IN A COLLEGE CLASSROOM.

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THIS EXPERIMENT WAS DESIGNED TO TEST WHETHER STUDENTS WHOSE GRADES ARE PARTLY DETERMINED BY THE PERFORMANCE OF OTHERS IN THE GROUP (THE COOPERATIVE CONDITION) WILL SCORE HIGHER ON EXAMINATIONS THAN THOSE WHOSE GRADES ARE DETERMINED BY THEIR RAW SCORES WITHIN THEIR GROUPS (COMPETITIVE CONDITION). WHEN COGNITIVE LEARNING IN THE COOPERATIVE ENVIRONMENT WAS COMPARED WITH THAT IN THE CONVENTIONAL COMPETITIVE SITUATION, THE MEASURED CHANGE WAS HIGHER FOR THE LATTER. HOWEVER, OTHER PREVIOUS STUDIES OF EFFECTS IN BOTH SCHOOL AND INDUSTRY HAVE SHOWN THAT COMPETITION IS NOT UNQUESTIONABLY SUPERIOR TO COOPERATION AND, FURTHER, THAT COMPETITION PRODUCES ITS DAMAGING EFFECTS IN THE EARLY SCHOOL YEARS. THESE EFFECTS DEPRIVE SOCIETY OF THE TALENTS OF THE NON-ADAPTIVE STUDENTS, SINCE BY HIGH SCHOOL OR COLLEGE THE OTHERS HAVE ACCEPTED THE COMPETITIVE STRUCTURE. IF COOPERATIVE CONDITIONS COULD BE INITIATED EARLY ENOUGH IN THE EDUCATIONAL PROCESS, THE COMPETITIVE CONDITION MIGHT NOT LATER BE SEEN AS SO REASONABLE OR NECESSARY. THE AUTHOR SUGGESTS A SOCIOLOGICAL STUDY OF SCHOOL CLIMATES THAT DO NOT SHARE THE SUSPECTED DETRIMENTAL ASPECTS OF COMPETITION BUT DO SUPPORT OTHER INTELLECTUAL STIMULATION. THIS PAPER WAS PRESENTED AT THE MEETINGS OF THE AMERICAN SOCIOLOGICAL ASSOCIATION (MIAMI BEACH, 1966). (HH)

A PRELIMINARY REPORT OF A STUDY OF THE EFFECTS OF COMPETITION AND COOPERATION IN A COLLEGE CLASSROOM

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This research was undertaken because I think that the function of competition as a motivating influence in our educational institutions and in the society at large has outlived its usefulness. It was a natural concomitant of an economy of scarcity that no longer obtains. Just as new political and economic forms will be required to provide a rational distribution of the goods that our current technology affords us the means to produce in abundance, using only a portion of the manpower available, so new processes must be developed that will stimulate and enable a maximum number of individuals to reach their highest intellectual potential.

Educational achievement is becoming a major consideration in the allocation of occupational roles and, realistically, this is a useful criterion in a bureaucratized and technologically complex society. Such a society also requires both a high degree of cognitive skills and adequate emotional functioning on the part of a large share of its members if it is to remain viable. At the present time, there is a shortage of individuals who possess needed skills and a surplus of manpower in unskilled job categories. In the foreseeable future the problem will remain one of recruiting and adequately training a large enough number of individuals rather than one of selecting a few from an oversupply of qualified candidates. It is here that the efficacy of competition as a norm in the educational environment may be questioned. Does it effectively challenge most individuals to achieve their highest potential intellectually, and actually produce the highest possible

level of cognitive skills for most of the members of our society? And, what are the effects on the personality development and mental stability of the successful and unsuccessful aspirants?

Detrimental effects of competitive norms in the educational process on the personality have been pointed out by several psychologists and psychiatrists. Kagan (1) for example, suggests that children are vulnerable to guilt feelings generated by success which punishes a peer or by the hostile feelings toward rivals that unsuccessful contenders may try to conceal. He claims this is especially prevalent among girls and may account for the fact that their performance in high school and college is relatively poorer than their abilities would predict. Kubie (2) has also suggested that the destructive rivalries that are generated by educational procedures are related to the activation of latent neurotogenic processes.

In his essay "The School Class as a Social System," Parsons (3) points out that in the early elementary grades children are selected as candidates for the level of roles they will assume as adults. This differentiation is accomplished somewhat unwittingly as the primary school teachers choose the potential achievers in their classes (often as much on the basis of the child's deportment and social skills as on any evidence of learning ability) and concentrate their efforts and concern on the development of these children. The teacher's evaluation is reflected in the pupil's self-concept and tends to operate as a self-fulfilling prophecy. If this is the case,--and many researchers

and theorists concerned with the education of children in disadvantaged areas claim that it is,--the children who perceive themselves unacceptable to, or incapable of accomplishment in the educational world are not motivated to achieve their full potential. Society loses whatever skills they might have contributed and assumes instead the burden of the problems that non-productive or rejected members of a community are prone to raise.

Coleman (4), in his study of the effects of cooperation and competition, concludes that social pressures on high school students militate against the pursuit of academic excellence. To overcome the social stigma characterized by such epithets as "rate-buster," he suggests the creation of competition between school academic teams (analogous to athletic teams.) In this situation, all students in the school would benefit from the superior performance of team members rather than be disadvantaged by the exceptional attainments of individuals that raised class normative standards.

Deutsch (5) investigated the functioning and productivity of cooperative and competitive groups composed of male Introductory Psychology students in 1949 and 1951. Although his research did not unequivocably demonstrate a direct relationship between a cooperative group structure and learning, Deutsch calls attention to the implications of his findings in regard to educational grading systems and suggests a reexamination of the assumptions underlying the competitive climate in education. His findings clearly supported his hypotheses relating to superior group functioning in cooperative groups compared to competitive

groups, for example, in greater coordination of efforts, attentiveness to fellow members, mutual comprehension of communication, etc.

These studies and a replication by Grossack (6) using female college students, employed production of solutions to human relations problems as the criterion of task performance. Groups were induced to work cooperatively by grading members according to the achievement of their groups, which was determined by its relative ranking in the production of solutions with the other cooperative groups. In the competitive groups, each individual was graded according to his contribution to the group solution, in a rank order. It will be noted that the cooperative situation was stimulated by the substitution of group competition for individual competition, which may obscure the clarity of the comparative effects of the two processes.

Shaw (7) experimented with cooperative and competitive groups and individuals on a tracking task and a puzzle-solving task. In both types of tasks the cooperative groups were more productive than the competitive or the individuals. The competitive groups, however, expressed greater satisfaction than the other two. Shaw's analysis of his results postulates two factors operating in the cooperative and competitive situation, the motivational and the procedural. He suggests that the high motivation induced in the competitive situation was responsible for the greater satisfaction, but caused the poorer performance because it disrupted the efficiency of the subjects.

McKeachie (8) reached similar conclusions from his studies of

college classroom structure,--that strong motivation may be a valuable stimulus, but that it inhibits performance if its accompanying anxiety is not resolved.

In an extensive longitudinal study of the relation of task performance to the formation of attitudes, Breer & Locke (9) suggest that in the course of working on a task cooperatively, group members may become cognitively aware of the instrumental value of cooperation, develop a cathetic interest in cooperating with each other, and establish supportive norms. They further suggest that such norms may be generalized to other situations and influence preferences and values.

In his classic field study of intergroup relations, Sherif (10) encountered extreme consequences of manipulated group competition in a boys' camp. The negative effects that developed in both the successful and unsuccessful groups included intense in-group compliance, derogatory name calling and stereotyping of rivals, and outbreaks of physical violence. The hostility generated in the two groups was alleviated only by pitting both groups against a new out-group.

In Blau's (11) study of competition and cooperation in a bureaucratic structure, he found competitive groups less productive, although the more competitive individuals in the competitive groups were relatively more productive than those in cooperative groups. That is, competitiveness and productivity were inversely related for groups but directly related for individuals within competitive groups.

In 1963, Miller & Hamblin (12) reworked the data from a number of earlier studies of cooperation and competition to test the possibility

that two variables were interacting to produce the inconsistent results that had been reported. When the factors of task interdependence and differential degree of rewarding were separately considered, the earlier data proved more consistent. Under conditions of high task interdependence, an inverse relationship was found between group productivity and the degree of differential rewarding; however, under conditions of low task interdependence productive efficiency did not increase with differential rewarding, as they had predicted.

Viewed as a whole, the rather extensive literature on the effects of cooperation and competition suggests the probability of facilitation of learning in a group that develops supportive norms as a result of its members' perception of interdependence in the pursuit of goal attainment. To test this probability, an experiment was designed using an Introductory Sociology class during the winter quarter of 1966.

The scope of the present report covers only one aspect of the effects of competition and cooperation on the educational process,--how they differentially influence objective measures of cognitive learning*,--and observations of group functioning and student attitudes under the experimental conditions.

The major hypothesis tested was:

> Students whose grades are, in part, determined by the performance of other students in their group (the cooperative condition) will achieve higher scores on examinations than students whose grades are effected by the ranking of their raw scores within their groups (the competitive condition.)

It should be pointed out that the proposition being tested is not

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*The acquisition of some new body of information, as defined by Boocock (13).

the relationship of certain group characteristics such as homogeneity, cohesion, or good sociometric patterns to individual learning in a group situation. The experiment was designed to test the efficacy of peer group pressures and of learning by teaching,--that is, the facilitation of a student's acquisition of new knowledge effected by the inducement of his responsibility for a grasp of it by his peers. The measure of cognitive learning that took place in this cooperative environment was compared to that acquired in the more conventional competitive situation in which the student was motivated to exceed the achievement of his peers.

PROCEDURE

An Introductory Sociology class of 46 students, 39 male and 7 female, ranging in age from 19 to 23, predominately sophomores, in an urban university, comprise the sample population. Three days a week the students met as a class for conventional lecture sessions. In addition to these meetings the students met one hour a week in eight groups of five to seven in separate seminar rooms for discussion. The students were randomly assigned to their groups which remained stable throughout the quarter. During the first week, I told the class they had been chosen to participate as subjects in a study by a research team from another university which was interested in various aspects of group dynamics as they pertained to higher education. I also explained that, in order to insure objectivity in the conduct of the course, I was not apprised of the exact nature of the problem they were investigating.

All the group discussion sessions were tape recorded, the students

having been assured that the instructor would not hear any of them or see their evaluations of the course until after the quarter was ended and the grades had been turned in. An audit of the tapes indicates that none of the groups thought the experiment dealt specifically with the effects of cooperative and competitive norms. The influence on productivity of the experimental situation was neutralized as all of the students perceived themselves as participants. They also appeared equally unconcerned by the fact that their discussions were being recorded after a few self-conscious opening remarks during the first session.

Chairmen, who had the responsibility of initiating the discussion, and secretaries to record attendance and comment on the discussion were appointed. These roles were alphabetically rotated within each group each week. The secretary's notes were used to report any unresolved problems that the group wished to have clarified in class and to inform me of the progress of the groups inasmuch as I did not hear the tapes during the quarter.

During the second class period, before announcement of the research participation had been made, the class was given a pretest that closely approximated the final examination given at the end of the course. The results of this supplied a measurement of the previous acquaintanship with sociological concepts that the students had acquired in other social science courses and supplied a base from which to measure the learning that took place. (An incidental benefit of the pretest was the whetting

of the students' curiosity about the scientific analysis of commonplace social phenomena. In a test run during the previous quarter of the procedures used in the experiment, this proved to be an effective teaching technique. I returned the corrected tests to the class which provided an overview of the course material and stimulated a good deal of controversy and interest in sociological analysis. This was not done during the experimental quarter because the final examination too closely resembled it. Students in the experimental class were told the test had been used to give the instructor an idea of how much sociology the class already knew in order to prepare effective lectures.)

At the first meeting of the discussion group sessions, I described the grading adjustments that could be earned to each of the groups separately. All groups were told that the grades for the whole class would be based on a preset standard,--90-100 = A, 80-89 = B, 70-79 = C, etc. In the competitive groups I explained that a five point bonus would be added to the raw score of the individual scoring highest in his group, a three point bonus to the score of the second highest, and a one point bonus to the third highest. In the cooperative groups, I explained that if the mean score of a particular group exceeded 80 points, each member of the group would receive a bonus equal to 5% of his raw score. If, for example, a student scored 87 on a test and his group averaged higher than 80, he would receive a bonus of four points, raising his recorded grade to 91.

It was made clear to all groups that the grade adjustments made in any group would not adversely affect any individual grades inasmuch as

everyone was graded by the preset standard which was not influenced by the normal curve of the scores. No competition between groups was encouraged although the tapes indicate some groups attempted to establish rivalry between themselves and others. There was no question of the value of the incentives because of the high percentage of male students in the class. The current draft policies determining deferment were based upon a student's class standing and a small difference in grade point percentages was of critical importance to each of them.

In spite of the powerful incentive of grade bonuses, the effects of imposed cooperative norms may have been mitigated by the competitive milieu of the university and by the deeply ingrained competitive habits most students have formed by the time they reach college.

Some anxiety was expressed over the grade bonuses in all the groups. In the cooperative groups this generally took the form of "Why should I have to do the work for someone who is going to goof-off?" In the competitive groups there was considerable discussion of strategies to beat the system such as "We'll all get the same score and share the bonus points." It is clear from the tapes that the physical setting of the groups (the well-appointed seminar rooms were a happy contrast to the usual classrooms) contributed to the ambivalent feelings evident among the competitive groups. Their immediate reaction to the group situation had been a kind of clubbiness that was frustrated by the grading system's divisive effect.

A retrospective criticism of the design that I would suggest is that I did not offer ample testing situations for the students to gain

experience in study strategies. The mid-term was their only opportunity to assess the effectiveness of their study techniques and to improve upon them prior to the final examination. Shorter bi-weekly quizzes would probably have intensified the differentiation of the experimental conditions.

RESULTS AND DISCUSSION

Profiles of the students in the two conditions reveal no statistically significant differences between them in age, ethnicity, socio-economic background, education of fathers, secondary school affiliation, financial aid, part-time work, or occupational goals. That is, the range of differences on these variables among students in the two experimental conditions was similar.

Several measurements were used to determine the change in cognitive learning that took place during the quarter. The final course grades of all students in the two experimental situations were compared, and the individual differences between the pretest scores and the equivalent objective part of the final examination were compared, yielding higher scores in both cases for the competitive groups. (Significant at the .05 level in the latter case and non-significant in the former.) Students in the competitive groups had both a higher mean grade point average at the beginning of the quarter (4.9%) and higher pretest scores (4.1%). When these are taken into consideration, the measured cognitive change remains higher for the competitive groups. The major hypothesis, therefore, was not supported.

A comparison of the grade point averages of all students at the beginning and end of the quarter was made for the two situations to determine if any spill-over occurred to other course work. The average change

of both groups was positive, and non-significantly higher for the cooperative groups in spite of the contribution of the sociology grades to the final average.

The results of the final examination were a reversal of those of the mid-term on which the cooperative groups had scored higher than the competitive. Tapes of the discussion sessions after the mid-term examinations had been returned to the class indicate considerable surprise and concern on the part of the students in the competitive groups. The level of the discussions in two of the groups deteriorated rapidly and remained poor for the balance of the meetings. In another group attendance dropped off significantly. It appears credible that these strategies were employed to avoid the appearance of refusing to help one another when, in fact, they had ceased to share ideas, and were studying harder individually than they would admit to one another.

Another possible explanation is that objective tests measure a dimension of learning that is not facilitated by discussion of the ramifications of sociological analysis. It is often claimed that objective tests cause problems for students who have a deeper understanding of the subject matter because they are more aware of the inevitable ambiguities. Such theorizing would suggest that half way through the course the cooperative students had learned the initial material well, but by the time of the final had passed the point of optimal achievement on objective tests. Their grades were significantly higher than the competitive groups. on the essay part of the final. This measurement is also hazardous, however, in that verbal skill plays a large part in successfully handling

subjective questions. Individual differences in verbal skills were not measured at the beginning of the quarter and differences evident in the essays could not be attributed to one sociology course.

The recordings of the students' discussions provide a mine of information on student attitudes. One recurrent theme is the desire of many students for an authoritative source person. The major objection they expressed to participation in the experiment was the loss of the lecture period that it entailed. Several complaints were raised that they were paying tuition to be instructed by an expert, not to exchange ideas with their peers. I think the practical emphasis on learning that is easily evaluated, and the growing importance of grades to the students' future societal roles have aggravated this tendency. Wider use of student-led discussion groups in the early college years may serve a useful function in weaning students away from dependence upon the instructor and encouraging initiative and more self-confidence in the expression of ideas.

The deliberate rotation of the chairmanship of the discussion sessions served to forestall the emergence of natural leaders who might have become surrogate instructors or resource persons. On their own initiative the chairman for the day in all of the groups assumed the responsibility of extra preparation for that day and took advantage of the opportunity to assert competence. When irrelevant or erroneous material was authoritatively expounded by a chairman, his peers readily took him to task and good arguments often ensued. Class size and the pressure of time militate against providing the opportunity for a large

number of students to participate in this kind of experience under normal classroom conditions. The conjunction of three lecture sessions and one student-led group discussion appears to combine the merits of economy of instructor time and maximum student participation.

Personality traits obviously influenced the quality of the group discussions. The research was designed to study the effects of the stimuli on an unselected, representative group of students and this class, which was created by the exigencies of the registration process, contained the range of personality types one expects on a large urban campus. One cooperative group was hampered by an anti-social student who obstructed good discussions; another was abetted by an exceptionally perceptive student who stimulated all the members of his group. I did not intervene to alleviate discordant situations in order to avoid contaminating the experimental conditions.

The overall quality of the discussions was clearly superior in the cooperative groups. The students appeared considerably more at ease and eager to contribute personal experiences that bore on the subject matter. The competitive groups produced more tension releasing jokes and irrelevant arguments and the divisive effect of the competitive grade bonuses was readily apparent. It was surprising to me, in the light of these differences, to find that the competitive students had evaluated the discussion sessions higher than the cooperative students,* although this finding is in accord with earlier research (e.g., Shaw, 7).

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* Following the final examination, students filled out a questionnaire containing eight items relating to various aspects of the course.

Ninety-five per cent of the competitive, versus 85% of the cooperative students rated the discussions helpful or extremely helpful to their understanding of the course material. Eighty per cent of the competitive vs. 69% of the cooperative students expressed a desire for at least one course each quarter that used discussion groups. Only in their estimate of the value of the discussions to other members of their group did the cooperative students rate them higher. Ninety-two per cent of the cooperative vs. 90% of the competitive students appraised them helpful or extremely helpful.

CONCLUSION

The inconclusiveness that has characterized the findings of the numerous studies of the effects of competition and cooperation on productivity in the schools and in industry indicates that competition is not unequivocably superior. The results of this study further substantiates this ambivalence.

The damaging effects of competition occur, it would appear from the literature, in the early educational stages. Their admission to college attests to the fact that the students participating in this experiment have adapted to the competitive structure of primary and secondary education. The potential skills of the non-adaptive students who were unable to enroll in college have been lost to society. Since the university is the training ground for future educators, it is not illogical to consider the higher educational levels as the rational loci of change. If cooperative norms are experienced by college students as instrumentally effective, or not deleterious, to their goal attainment, initiation of reforms in the educational process may be encouraged. As

long as competition remains the norm in college, the competitive process in the preparatory grades will be perceived as requisite and reasonable.

The investigation of alternative social climates that do not share the suspected detrimental aspects of competition, but do support maximum intellectual stimulation, provides a challenging task area for sociology.

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